

EXAMPLE 2. HYPOTHETICAL PETROLEUM REFINERY SCENARIO

FACILITY: PETROLEUM REFINERY

- Major (Listed) Source – Existing facility allowable emissions > 100 tpy for criteria pollutants NO_x, SO₂, and CO

SOLUTION SHEET

PROPOSED PROJECT:

A petroleum refinery would like to add a 225 MMBTU/hr crude and vacuum unit to their facility.

TOOLS:

Assume the following:

	<u>PM₁₀</u>	<u>SO₂</u>	<u>Pb</u>	<u>NO_x</u>	<u>VOC</u>	<u>CO</u>	<u>CO₂</u>	<u>CH₄</u>	<u>N₂O</u>
Emissions Reductions (tons/year)	-26	-75	0	-105	-20	-45	-38,647	-0.7	-0.7
New Equipment Emissions (tons/year)	40	110	0	140	35	100	115,941	2.2	2.1
Net Emissions Change	14	35	0	35	15	55	77,294	1.5	1.4

PROBLEM SOLVING:

Question 1: On a mass basis, what are the total emissions of GHGs?

CO₂+CH₄+N₂O = Total Emissions of GHG's (MASS)

77,294 tons + 1.5 tons + 1.4 tons = **77,297 tons/year**

Question 2: What are the total emissions of CO_{2e}?

Step 1: Refer to Global Warming Potential (GWP) Table (Title 40, Part 98, Subpart A, Table A-1)

Step 2: Identify pollutants and their respective GWPs.

Pollutant	Global Warming Potential
CO ₂	1
CH ₄	21
N ₂ O	310

$$CO_{2e}(tpy) = \sum (GWP_i \times MassEmissionRate_i(tpy))$$

$$CO_{2e}(tpy) = (77,294 \times 1) + (1.5 \times 21) + (1.4 \times 310) = \mathbf{77,760 \text{ tons/yr}}$$

Question 3: So, we have

GHGs (mass)	CO _{2e}
77,297 tons/yr	77,760 tons/yr

APPLICABILITY ANALYSIS (PSD):

Question 1: Does the permit action result in a net increase of any criteria pollutant that exceeds a PSD SER level?

No, net emissions changes of criteria pollutants are all less than the PSD SER levels

Question 2: Does the permit action have CO_{2e} emissions in excess of PSD threshold?

Yes, permit action has a net CO_{2e} increase of 77,760 TPY which is greater than the 75,000 TPY SER

Question 3: Does the permit action have GHG emissions in excess of PSD threshold (mass basis)?

Yes, the permit action has a net GHG emission increase of 77,297 TPY which is greater than the 0 TPY SER

If the answer is YES to BOTH Questions #2 & #3, then greenhouse gas must undergo PSD review based on the following:

- **permit decision occurs before 1/2/11:** greenhouse gas need not be considered for PSD review
- **permit decision occurs between 1/2/11 and 7/1/11:** greenhouse gas must undergo PSD review only if there are any criteria pollutants that must undergo PSD review
- **permit decision occurs on or after 7/1/11:** greenhouse gas must undergo PSD review along with any criteria pollutants that exceed their PSD SER

APPLICABILITY ANALYSIS (Title V):

TV permit decision occurs before 1/2/11: greenhouse gas need not be addressed in TV permit

TV permit decision occurs after 1/2/11: greenhouse gas must be addressed in TV permit ("anyway" source)

TV permit decision occurs after 7/1/11: greenhouse gas must be addressed in TV permit